What is claimed is:

1. A method comprising:

for each ear of a subject,

turning off vestibular responses in one ear of the subject;

evaluating vestibular response in the other ear of the subject; and

analyzing the vestibular responses from each ear to characterize an asymmetry of an inner ear balance function.

2. The method of claim 1, wherein turning off vestibular responses in one ear includes applying a stimulus having a first component directed to essentially completely inhibit activity in a semicircular canal of the one ear.

3. The method of claim 2, wherein evaluating vestibular response in the other ear includes applying the stimulus having a second component directed to probing a canal function of the other ear.

4. The method of claim 3, wherein applying the stimulus includes applying the stimulus to a device that rotates a seated subject about a vertical axis.

5. The method of claim 3, wherein applying the stimulus includes applying the stimulus to a clinical rotation chair.

6. A method comprising:

applying a stimulus to control motion of a device that rotates a subject about an axis, the stimulus having a bias component to control the motion of the device to temporarily turn off vestibular responses in one ear of the seated subject and a probe component to modulate the motion of the device while the vestibular responses in the one ear are turned off to evaluate responsiveness in another ear of the subject.

7. The method of claim 6, wherein the method further includes applying the stimulus in a substantially completely dark room.

8. The method of claim 6, wherein the method further includes applying the stimulus in a substantially dark room having a illumined visual target.

9. The method of claim 6, wherein applying a stimulus includes applying the stimulus with the probe component having a frequency higher than that of the bias component and an amplitude lower than that of the bias component

10. The method of claim 6, wherein applying a stimulus includes applying the stimulus with the bias component of the stimulus including a sinusoidal waveform and the probe component of the stimulus including a sinusoidal waveform.

11. The method of claim 10, wherein applying the stimulus includes applying the stimulus with the bias component having a frequency less than or equal to 0.1 Hz and the probe component having a frequency of about 1 Hz.

12. The method of claim 10, wherein applying the stimulus includes applying the stimulus with the bias component having an amplitude between about 150° per second peak velocity and about 250° per second peak velocity, and the probe component has an amplitude between about 10° per second peak velocity and about 20° per second peak velocity.

13. The method of claim 6, wherein applying a stimulus includes applying the stimulus with the bias component of the stimulus including a pulse waveform and a step waveform and the probe component of the stimulus including a sinusoidal waveform.

14. The method of claim 13, wherein applying the stimulus includes applying the stimulus with the probe component of the stimulus added to the acceleration step waveform of the bias component.

15. The method of claim 13, wherein applying the stimulus includes applying the stimulus with the bias component of the stimulus including an acceleration pulse waveform of a first duration and a step waveform of a second duration, the second duration longer than the first duration.

16. The method of claim 15, wherein applying the stimulus includes applying the stimulus with the bias component of the stimulus including the acceleration pulse waveform having about a $400°/s^2$ amplitude lasting about 1 second and the acceleration step waveform having about a $30°/s^2$ amplitude lasting about 4 seconds.

17. The method of claim 16, wherein applying the stimulus includes applying the stimulus with the probe component of the stimulus including a sinusoidal waveform having a frequency of about 1 Hz and an amplitude of about 20°/s peak velocity added to the acceleration step waveform of the bias component.

18. The method of claim 6, wherein the method further includes:

isolating bias responses to the bias component of the stimulus from probe responses to the probe component of the stimulus; and

analyzing separately the bias responses and the probe responses.

19. The method of claim 18, wherein isolating bias responses from probe responses includes measuring eye movements resulting from applying the stimulus to control motion of the device.

20. A method comprising:

computing eye velocity from eye position data from a subject as a result of applying a stimulus, the stimulus having a bias component and a probe component such that vestibular responses in one ear of the subject are temporarily turned off during the application of the bias component with the probe component modulating the bias component to evaluate responsiveness in another ear of the subject;

isolating a bias response to the bias component of the stimulus from a probe response to the probe component of the stimulus; and

analyzing separately the bias response and the probe response.

21. The method of claim 20, wherein the method further includes

obtaining a slow phase eye velocity;

bandpass filtering the slow phase eye velocity to isolate the probe response providing a bandpass slow phase eye velocity; and

parameterizing the probe response.

22. The method of claim 21, wherein the method further includes averaging the bandpass slow phase eye velocity over a number of cycles of the bias component and parameterizing the averaged bandpass slow phase eye velocity.

23. The method of claim 22, wherein parameterizing the averaged bandpass slow phase eye velocity includes using a curve fit of the averaged bandpass slow phase eye velocity, $\left\langle \hat{\dot{\theta}}_{bp} \right\rangle$, the curve fit related to a probe frequency, ω_p, and a bias frequency, ω_b, and having a probe component eye velocity amplitude, A_p, a probe component phase, φ_p, a phase of the modulation waveform, φ_b, and a modulation factor, m, that varies from 0 to 1, as fit parameters.

24. The method of claim 23, wherein using a curve fit includes using the curve fit according to the relation

$$\left\langle \hat{\dot{\theta}}_{bp} \right\rangle = A_p\left(1 + m\cos\left(\omega_b t + \varphi_b\right)\right)\cos\left(\omega_p t + \varphi_p\right).$$

25. The method of claim 21, wherein bandpass filtering the slow phase eye velocity includes filtering the slow phase eye velocity using bandpass filter of about 0.5 Hz to about 5 Hz.

26. The method of claim 24, wherein the bandpass slow phase eye velocity is averaged over five 0.1 Hz cycles.

27. The method of claim 20, wherein the method further includes

obtaining a slow phase eye velocity and a stimulus velocity;

low pass filtering the slow phase eye velocity to remove the probe response providing a low pass slow phase eye velocity;

low pass filtering the stimulus velocity to remove the probe component providing a low pass bias velocity; and

obtaining an input-output function correlated to the low pass phase eye velocity vs the isolated bias component.

28. The method of claim 27, wherein the method further includes averaging the low pass slow phase eye velocity and the low pass bias velocity over a number of cycles of the bias component.

29. The method of claim 28, wherein obtaining an input-output function includes:

estimating a phase for the averaged isolated bias component and a phase for the averaged low pass slow phase eye velocity at a frequency of the bias component; and

time shifting the averaged isolated bias component and the averaged low pass slow phase eye velocity such that the two are aligned with a 180° phase shift between them, after estimating the phase for the averaged isolated bias component and the phase for the averaged low pass slow phase eye velocity.

30. The method of claim 29, wherein the method further includes determining a curve fit to the averaged low pass slow phase eye velocity, $\left\langle \hat{\theta}'_{lp} \right\rangle$, related to the averaged low pass bias velocity, $\langle \omega'_{lp} \rangle$, the curve fit having fit parameters K related to gain behavior of the input-output function and β related to a saturation behavior of the input-output function.

31. The method of claim 29, wherein determining a curve fit includes determining the curve fit according to the relation

$$\left\langle \hat{\dot{\theta}}'_{lp} \right\rangle = \frac{K\left(1 - e^{-\beta\left\langle \omega'_{lp} \right\rangle}\right)}{1 + e^{-\beta\left\langle \omega'_{lp} \right\rangle}}.$$

32. The method of claim 27, wherein low pass filtering the slow phase eye velocity includes filtering the slow phase eye velocity using a low pass filter having about a 0.5 Hz cutoff.

33. The method of claim 27, wherein the a low pass slow phase eye velocity is averaged over five 0.1 Hz cycles.

34. The method of claim 27, wherein the method further includes determining deviations of the input-output function from a straight line.

35. A computer-readable medium having computer-executable instructions for performing a method comprising:

applying a stimulus to control motion of a device that rotates a subject about an axis, the stimulus having a bias component to control the motion of the device to temporarily turn off vestibular responses in one ear of the seated subject and a probe component to modulate the motion of the device while the vestibular responses in the one ear are turned off to evaluate responsiveness in another ear of the subject.

36. The computer-readable medium of claim 35, wherein applying a stimulus includes applying the stimulus with the probe component having a frequency higher than that of the bias component and an amplitude lower than that of the bias component

37. The computer-readable medium of claim 35,wherein applying a stimulus includes applying the stimulus with the bias component of the stimulus including a sinusoidal waveform and the probe component of the stimulus including a sinusoidal waveform.

38. The computer-readable medium of claim 37, wherein applying the stimulus includes applying the stimulus with the bias component having a frequency less than or equal to 0.1 Hz and the probe component having a frequency of about 1 Hz.

39. The computer-readable medium of claim 35,wherein applying a stimulus includes applying the stimulus with the bias component of the stimulus including a pulse waveform and a step waveform and the probe component of the stimulus including a sinusoidal waveform.

40. The computer-readable medium of claim 39, wherein applying the stimulus includes applying the stimulus with the probe component of the stimulus added to the acceleration step waveform of the bias component.

41. The computer-readable medium of claim 39, wherein applying the stimulus includes applying the stimulus with the bias component of the stimulus including an acceleration pulse waveform of a first duration and a step waveform of a second duration, the second duration longer than the first duration.

42. The computer-readable medium of claim 35, wherein the computer-executable instructions for performing the method further includes:

isolating bias responses to the bias component of the stimulus from probe responses to the probe component of the stimulus; and

analyzing separately the bias responses and the probe responses.

43. The computer-readable medium of claim 42, wherein isolating bias responses from probe responses includes measuring eye movements resulting from applying the stimulus to control motion of the device.

44. A computer-readable medium having computer-executable instructions for performing a method comprising:

obtaining eye velocity generated from eye position data from a subject as a result of applying a stimulus, the stimulus having a bias component and a probe component such that vestibular responses in one ear of the subject are temporarily turned off during the application of the bias component with the probe component modulating the bias component to evaluate responsiveness in another ear of the subject;

isolating a bias response to the bias component of the stimulus from a probe response to the probe component of the stimulus; and

analyzing separately the bias response and the probe response.

45. The computer-readable medium of claim 44, wherein the computer-executable instructions for performing the method further includes parameterizing a bandpass slow phase eye velocity generated from isolating the probe response with respect to an acquired a slow phase eye velocity by bandpass filtering the slow phase eye velocity.

46. The computer-readable medium of claim 45, wherein parameterizing a bandpass slow phase eye velocity includes parameterizing an averaged bandpass slow phase eye velocity obtained from averaging the bandpass slow phase eye velocity over a number of cycles of the bias component.

47. The computer-readable medium of claim 46, wherein parameterizing the averaged bandpass slow phase eye velocity includes using a curve fit of the averaged bandpass slow phase eye velocity, $\left\langle \hat{\dot{\theta}}_{bp} \right\rangle$, the curve fit related to a probe frequency, ω_p, and a bias frequency, ω_b, and having a probe component eye velocity amplitude, A_p, a probe component phase, φ_p, a phase of the modulation waveform, φ_b, and a modulation factor, m, that varies from 0 to 1, as fit parameters.

48. The computer-readable medium of claim 47, wherein using a curve fit includes using the curve fit according to the relation

$$\left\langle \hat{\dot{\theta}}_{bp} \right\rangle = A_p\left(1 + m\cos\left(\omega_b t + \varphi_b\right)\right)\cos\left(\omega_p t + \varphi_p\right).$$

49. The computer-readable medium of claim 44, wherein the computer-executable instructions for performing the method further includes obtaining an input-output function correlated to a low pass slow phase eye velocity vs an isolated bias component, the low pass slow phase eye velocity generated from low pass filtering a slow phase eye velocity, the low pass bias velocity generated from low pass filtering a stimulus velocity of the stimulus.

50. The computer-readable medium of claim 49, wherein the input-output function is correlated to an averaged low pass slow phase eye velocity and an averaged low pass bias velocity, the averaged low pass slow phase eye velocity and the averaged low pass bias velocity obtained by averaging the low pass slow phase eye velocity and the low pass bias velocity over a number of cycles of the bias component.

51. The computer-readable medium of claim 50, wherein the computer-executable instructions for performing the method further includes:

estimating a phase for the averaged low pass bias velocity and a phase for the averaged low pass slow phase eye velocity at a frequency of the bias component; and

time shifting the averaged low pass bias velocity and the averaged low pass slow phase eye velocity such that the two are aligned with a 180° phase shift between them, after estimating the phase for the averaged isolated bias component and the phase for the averaged low pass slow phase eye velocity.

52. The computer-readable medium of claim 51, wherein the computer-executable instructions for performing the method further includes, after time shifting the averaged low pass bias velocity and the averaged low pass slow phase eye velocity, determining a curve fit to the averaged low pass slow phase eye velocity, $\left\langle \hat{\dot{\theta}}'_{lp} \right\rangle$, related to the averaged low pass bias velocity, $\langle \omega'_{lp} \rangle$, the curve fit having fit parameters K related to gain behavior of the input-output function and β related to a saturation behavior of the input-output function.

53. The computer-readable medium of claim 52, wherein determining a curve fit includes determining the curve fit according to the relation

$$\left\langle \hat{\theta}'_{lp} \right\rangle = \frac{K\left(1 - e^{-\beta\langle \omega'_{lp} \rangle}\right)}{1 + e^{-\beta\langle \omega'_{lp} \rangle}}.$$

54. The computer-readable medium of claim 49 wherein the computer-executable instructions for performing the method further includes determining deviations of the input-output function from a straight line.

55. A system comprising:

a device that rotates a subject; and

a motion control to control motion of the device, the motion control adapted to provide a stimulus to the device to control motion of the device to temporarily turn off vestibular responses in one ear of the subject and to modulate the motion of the device while the vestibular responses in the one ear are turned off to evaluate responsiveness in another ear of the subject.

56. The system of claim 55, wherein the stimulus includes a bias component of sufficient magnitude to stimulate motion of the device to temporarily turn off vestibular responses in the one ear of the subject, and a probe component to modulate the motion of the device while the vestibular responses in the one ear are turned off to evaluate responsiveness in another ear of the subject.

57. The system of claim 56, wherein the system method further includes an illuminated visual target.

58. The system of claim 56, wherein the probe component has a frequency higher than that of the bias component and an amplitude lower than that of the bias component

59. The system of claim 56, wherein the bias component of the stimulus includes a sinusoidal waveform and the probe component of the stimulus includes a sinusoidal waveform.

60. The system of claim 59, wherein the bias component has a frequency less than or equal to 0.1 Hz and the probe component has a frequency of about 1 Hz.

61. The system of claim 59, wherein the bias component has an amplitude between about 150° per second peak velocity and about 250° per second peak velocity, and the probe component has an amplitude between about 10° per second peak velocity and about 20° per second peak velocity.

62. The system of claim 56, wherein the bias component of the stimulus includes a pulse waveform and a step waveform and the probe component of the stimulus includes a sinusoidal waveform.

63. The system of claim 62, wherein the probe component of the stimulus is added to the step waveform of the bias component.

64. The system of claim 62, wherein the bias component of the stimulus includes an acceleration pulse waveform of a first duration and a step waveform of a second duration, the second duration longer than the first duration.

65. The system of claim 64, wherein the acceleration pulse waveform has about a $400°/s^2$ amplitude lasting about 1 second and the acceleration step waveform has about a $30°/s^2$ amplitude lasting about 4 seconds.

66. The system of claim 64, wherein the probe component of the stimulus includes a sinusoidal waveform having a frequency of about 1 Hz and an amplitude of about 20°/s peak velocity added to the acceleration step waveform of the bias component.

67. The system of claim 56, wherein the device and the motion control are integrated.

68. The system of claim 56, wherein the device is a clinical rotation chair.

69. The system of claim 56, wherein the system a clinical rotation chair.

70. The system of claim 56, the system further includes eye movement recording equipment.

71. The system of claim 56, the system further includes a diagnostic tool to analyze a bias response related to the bias component of the stimulus and a probe response related to the probe component of the stimulus.

72. The system of claim 71, wherein the diagnostic tool separately analyzes the bias response and the probe response.

73. The system of claim 72, wherein the diagnostic tool includes a bandpass filter to filter a slow phase eye velocity to isolate the probe response providing a bandpass slow phase eye velocity, and tools to parameterize the probe response.

74. The system of claim 73, wherein the diagnostic tool is adapted to average the bandpass slow phase eye velocity over a number of cycles of the bias component and to parameterize the averaged bandpass slow phase eye velocity.

75. The system of claim 73, wherein the bandpass filter has a pass band from about 0.5 Hz to about 5 Hz.

76. The system of claim 75, wherein the diagnostics tool is adapted to average the bandpass slow phase eye velocity over five 0.1 Hz cycles.

77. The system of claim 71, wherein the diagnostic tool includes:

a low pass filter to filter a slow phase eye velocity to remove the probe response to provide a low pass slow phase eye velocity; and

a low pass filter to filter the stimulus velocity to remove the probe component to provide a low pass bias velocity, wherein the diagnostics tool is adapted to provide an input-output function correlated to the low pass phase eye velocity vs the isolated bias component.

78. The system of claim 77, wherein the diagnostic tool is adapted to average the low pass slow phase eye velocity and the low pass bias velocity over a number of cycles of the bias component.

79. The system of claim 78, wherein the diagnostic tool is adapted to estimate a phase for the averaged isolated bias component and a phase for the averaged low pass slow phase eye velocity at a frequency of the bias component, and to time shift the averaged isolated bias component and the averaged low pass slow phase eye velocity such that the two are aligned with a 180° phase shift between them after estimating the phase for the averaged isolated bias component and the phase for the averaged low pass slow phase eye velocity.

80. The system of claim 79, wherein the diagnostic tool uses a discrete Fourier transform to estimate a phase for the averaged isolated bias component and a phase for the averaged low pass slow phase eye velocity at a frequency of the bias component.

81. The system of claim 80, wherein the system is adapted to determine a curve fit to the averaged low pass slow phase eye velocity related to the averaged low pass bias velocity, and fit parameters K related to gain behavior of the input-output function and β related to a saturation behavior of the input-output function.

82. The system of claim 77, wherein the low pass filter to filter a slow phase eye velocity low pass has about a 0.5 Hz cutoff.

83. The system of claim 77, wherein the system is adapted to average the low pass slow phase eye velocity over five 0.1 Hz cycles.

84. The system of claim 55, wherein the system includes a computer.

85. A diagnostic tool comprising:

an eye velocity computing unit to compute eye velocity from eye position data from a subject as a result of applying a stimulus to affect vestibular responses of the subject, the stimulus having a bias component and a probe component such that vestibular responses in one ear of the subject are temporarily turned off during the application of the bias component with the probe component modulating the bias component to evaluate responsiveness in another ear of the subject; and

filters to isolate a bias response to the bias component of the stimulus from a probe response to the probe component of the stimulus to analyze separately the bias response and the probe response.

86. The diagnostic tool of claim 85, wherein the filters includes a bandpass filter to filter a slow phase eye velocity to isolate the probe response providing a bandpass slow phase eye velocity.

87. The diagnostic tool of claim 86, wherein the diagnostic tool includes tools to parameterize the probe response.

88. The diagnostic tool of claim 87, wherein the tools to parameterize the probe response are adapted to average the bandpass slow phase eye velocity over a number of cycles of the bias component and to parameterize the averaged bandpass slow phase eye velocity.

89. The diagnostic tool of claim 88, wherein the bandpass filter has a pass band from about 0.5 Hz to about 5 Hz.

90. The diagnostic tool of claim 89, wherein the tools to parameterize the probe response are adapted to average the bandpass slow phase eye velocity over five 0.1 Hz cycles.

91. The diagnostic tool of claim 89, wherein the tools to parameterize the probe response adapted to parameterize the averaged bandpass slow phase eye velocity include tools to curve fit the averaged bandpass slow phase eye velocity, $\hat{\dot{\theta}}_{bp}$, the curve fit related to a probe frequency, ω_p, and a bias frequency, ω_b, and having a probe component eye velocity amplitude, A_p, a probe component phase, φ_p, a phase of the modulation waveform, φ_b, and a modulation factor, m, that varies from 0 to 1, as fit parameters.

92. The diagnostic tool of claim 91, wherein the curve fit includes a curve fit according to the relation

$$\left\langle \hat{\dot{\theta}}_{bp} \right\rangle = A_p\left(1 + m\cos\left(\omega_b t + \varphi_b\right)\right)\cos\left(\omega_p t + \varphi_p\right).$$

93. The diagnostic tool of claim 85, wherein the diagnostic tool includes:

a low pass filter to filter a slow phase eye velocity to remove the probe response to provide a low pass slow phase eye velocity; and

a low pass filter to filter the stimulus velocity to remove the probe component to provide a low pass bias velocity, wherein the diagnostics tool is adapted to provide an input-output function correlated to the low pass phase eye velocity vs the isolated bias component.

94. The diagnostic tool of claim 93, wherein the diagnostic tool is adapted to average the low pass slow phase eye velocity and the low pass bias velocity over a number of cycles of the bias component.

95. The diagnostic tool of claim 94, wherein the diagnostic tool is adapted to estimate a phase for the averaged isolated bias component and a phase for the averaged low pass slow phase eye velocity at a frequency of the bias component, and to time shift the

averaged isolated bias component and the averaged low pass slow phase eye velocity such that the two are aligned with a 180° phase shift between them after estimating the phase for the averaged isolated bias component and the phase for the averaged low pass slow phase eye velocity.

96. The diagnostic tool of claim 95, wherein the diagnostic tool uses a discrete Fourier transform to estimate a phase for the averaged isolated bias component and a phase for the averaged low pass slow phase eye velocity at a frequency of the bias component.

97. The diagnostic tool of claim 95 wherein the diagnostic tool is adapted to determine a curve fit to the averaged low pass slow phase eye velocity, $\hat{\theta}'_{lp}$, related to the averaged low pass bias velocity, ω'_{lp}, and fit parameters K related to gain behavior of the input-output function and β related to a saturation behavior of the input-output function.

98. The diagnostic tool of claim 97, wherein the curve fit includes a curve fit according to the relation

$$\left\langle \hat{\theta}'_{lp} \right\rangle = \frac{K\left(1-e^{-\beta\langle\omega'_{lp}\rangle}\right)}{1+e^{-\beta\langle\omega'_{lp}\rangle}}.$$

99. The diagnostic tool of claim 93, wherein the low pass filter to filter a slow phase eye velocity low pass has about a 0.5 Hz cutoff.

100. The diagnostic tool of claim 99, wherein the diagnostic tool is adapted to average the low pass slow phase eye velocity over five 0.1 Hz cycles.

101. The diagnostic tool of claim 93, wherein the diagnostic tool is adapted to determine deviations of the input-output function from a straight line.

102. The diagnostic tool of claim 93, wherein the diagnostic tool includes a computer.